$$\cos\frac{14\pi}{17}=\tfrac{1}{2}(\omega^7+\omega^{10})=x_{14};$$

$$\cos\frac{16\pi}{17}=\tfrac{1}{2}(\omega^8+\omega^9)=x_{15};$$

We have to solve the chain of equations:

$$k^2+k-4=0. \quad \text{Roots } k_1,\ k_2.$$
$$l^2-k_1 l-1=0. \quad \text{Roots } l_1,\ l_2.$$
$$l^2-k_2 l-1=0. \quad \text{Roots } l_3,\ l_4.$$
$$4x^2-2l_1x+l_3=0. \quad \text{Roots } x_8,\ x_{11}.$$
$$4x^2-2l_2x+l_4=0. \quad \text{Roots } x_9,\ x_{15}.$$
$$4x^2-2l_3x+l_2=0. \quad \text{Roots } x_{10},\ x_{12}.$$
$$4x^2-2l_4x+l_1=0. \quad \text{Roots } x_{13},\ x_{14}.$$

These fifteen roots together with the root $x=1$ make the sixteen roots. From symmetry, the sets of values for y, z, and w, are the same as for x.

PROBLEMS FOR SOLUTION.

ALGEBRA.

337. Proposed by I. M. CURTISS, Brooklyn, N. Y.

Three regiments move north as follows: B is 20 miles east of A; C is 20 miles south of B, and each marches 20 miles between the hours of 5 a. m. and 3 p. m. A horseman with a message from C starts at 5 a. m. and rides north till he overtakes B, then sets a straight course for the point at which he calculates to overtake A, then sets a straight course for the next point at which he will again overtake B, then rides south to the point where he first overtook B, reaching that point at the same time as C, namely 3 p. m. What uniform rate of travel enabled the messenger to do this?

338. Proposed by R. D. CARMICHAEL, Princeton University.

Prove that $\pi=3+\frac{1}{3}\cdot\frac{1}{1.2}-\frac{1}{5}\cdot\frac{1}{2.3}+\frac{1}{7}\cdot\frac{1}{3.4}-\frac{1}{9}\cdot\frac{1}{4.5}+\ldots$

339. Proposed by E. B. ESCOTT, University of Michigan, Ann Arbor, Mich.

Prove that if $a_1<2$ and $a_n=a_{n-1}^2-2$, $\frac{1}{a_1}+\frac{1}{a_1 a_2}+\frac{1}{a_1 a_2 a_3}+\ldots$
$=\frac{1}{2}[a_1-\sqrt{(a_1^2-4)}]$.